





*MWRA's Ongoing Contribution to  
Wastewater Based  
Epidemiology*

January 18, 2023



# MWRA Regional Wastewater Collection System

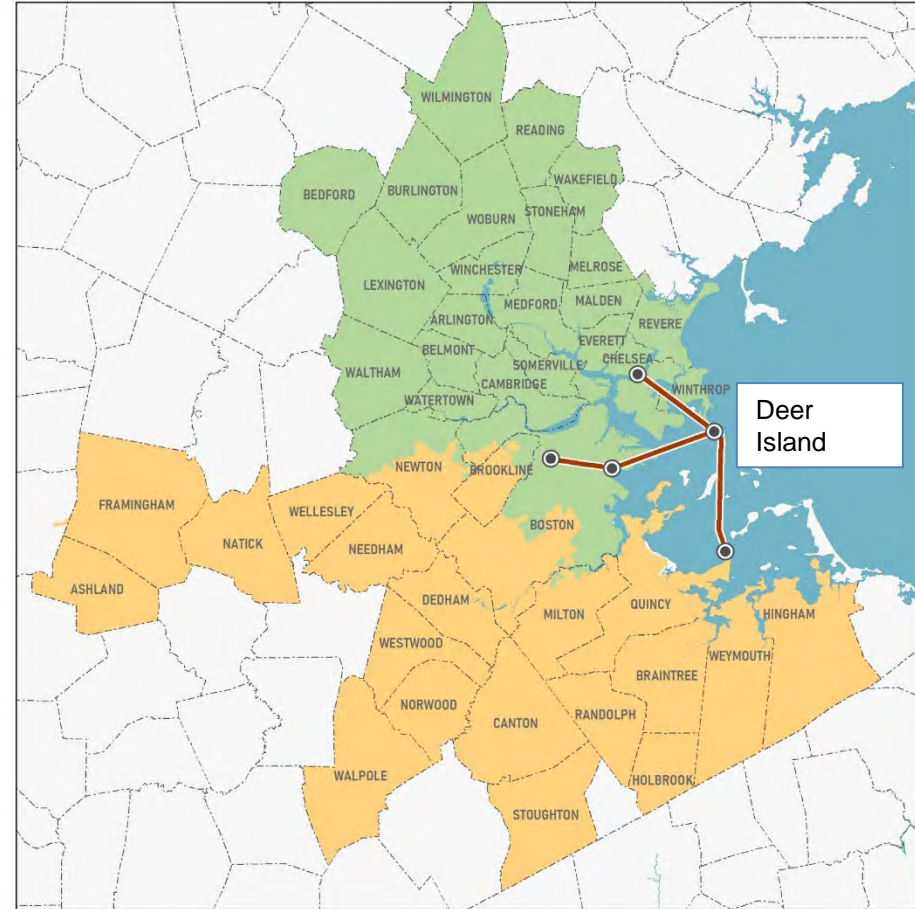
- 43 Metropolitan area communities
- 4 Combined sewer communities
- 4 Headworks facilities
  - Screening
  - Grit removal
- Deer Island Treatment Plant
  - Average flow 360 MGD
  - Peak capacity 1.3 BGD
  - Treated discharge to outfall in Massachusetts Bay





# North and South System Communities

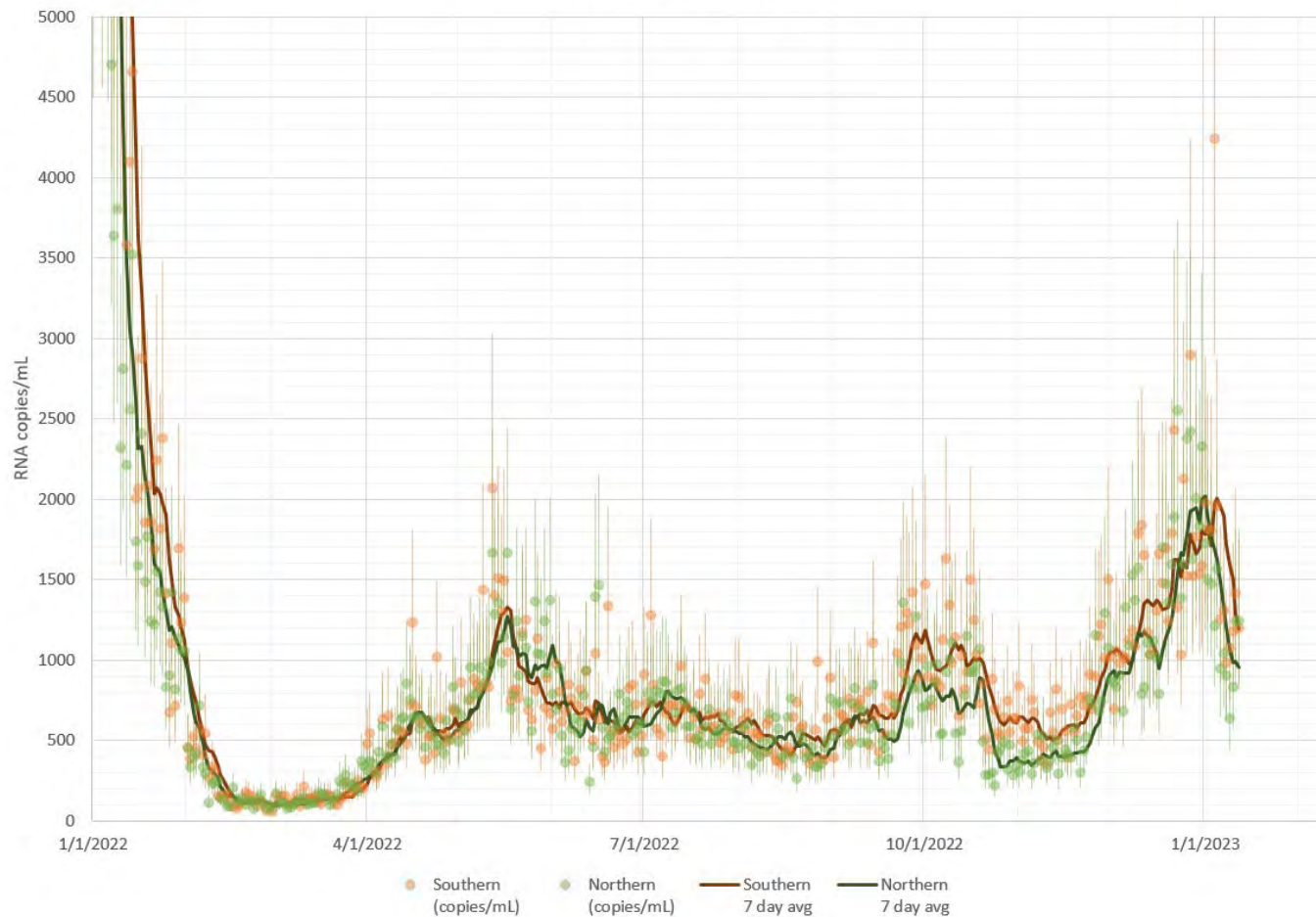
- Flow directed to pump stations at Deer Island for treatment
- Samples collected from pump stations represent wastewater from north and south system communities
- Since 2020 samples have been analyzed for viral RNA





# Current Data from MWRRA.com

DITP Viral RNA Signal by Date

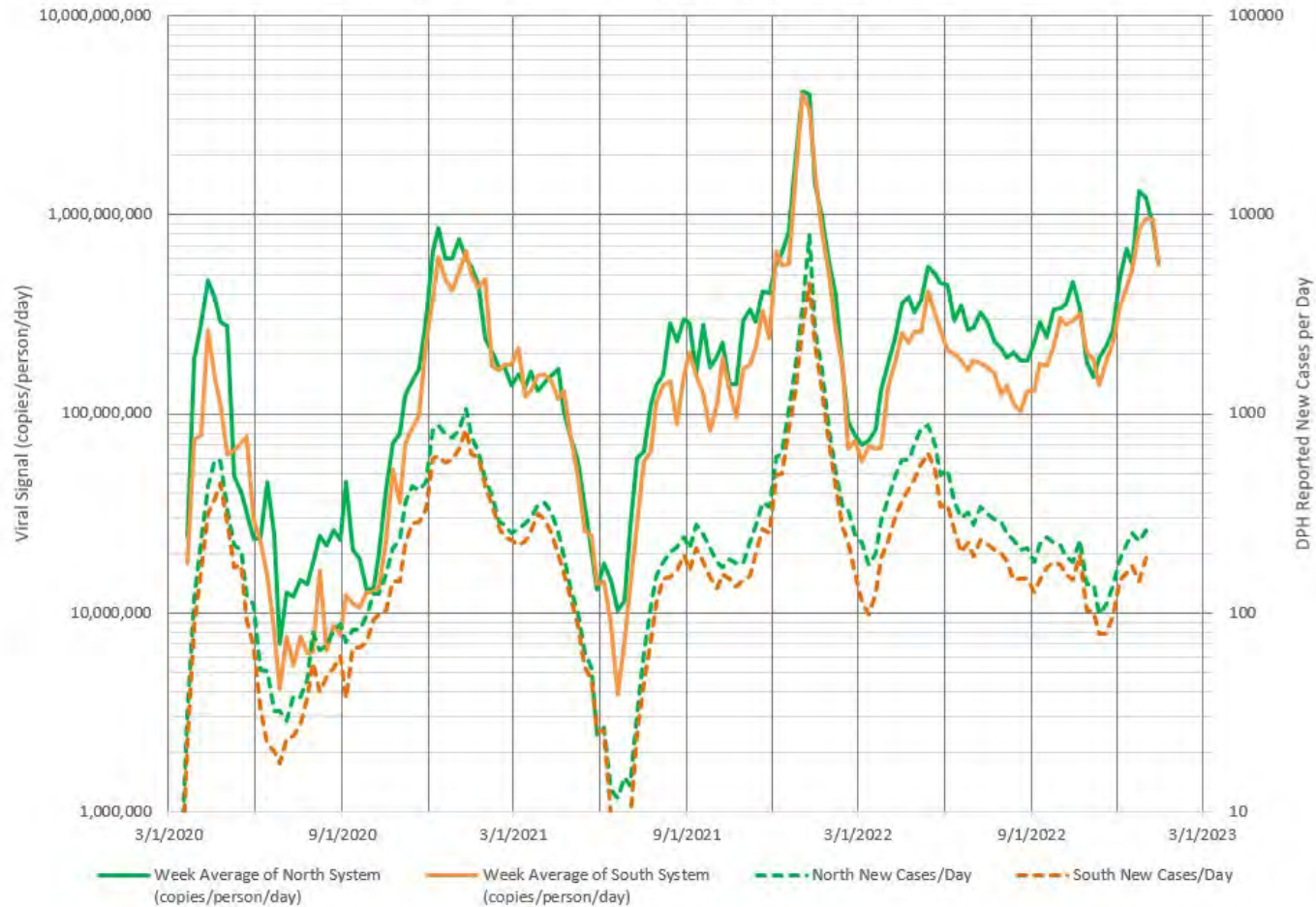






# Comparison of Wastewater Signal to Cases

Weekly Average Viral Signal and DPH New Cases by Date





## Summary notes

- Started in March 2020 with a preliminary request for samples
- Led to 1<sup>st</sup> report of detection in wastewater in the U.S.
- Current program:
  - Daily samples from Deer Island since November 2020
  - Longest continuous daily sample record in the world?
  - DPH funded through 2023
- Results are shared with the state Command Center as received
- Results are available at <http://www.mwra.com/biobot/biobotdata.htm>
- Additional data now available at <http://publichealth.verily.com/#Boston,%20MA:SARS-CoV-2>



# *Update on Temporary Fluoride Shutdown*

January 18, 2023

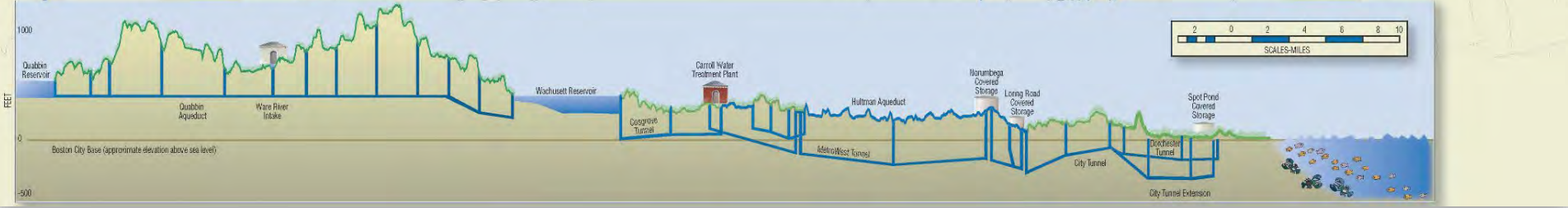
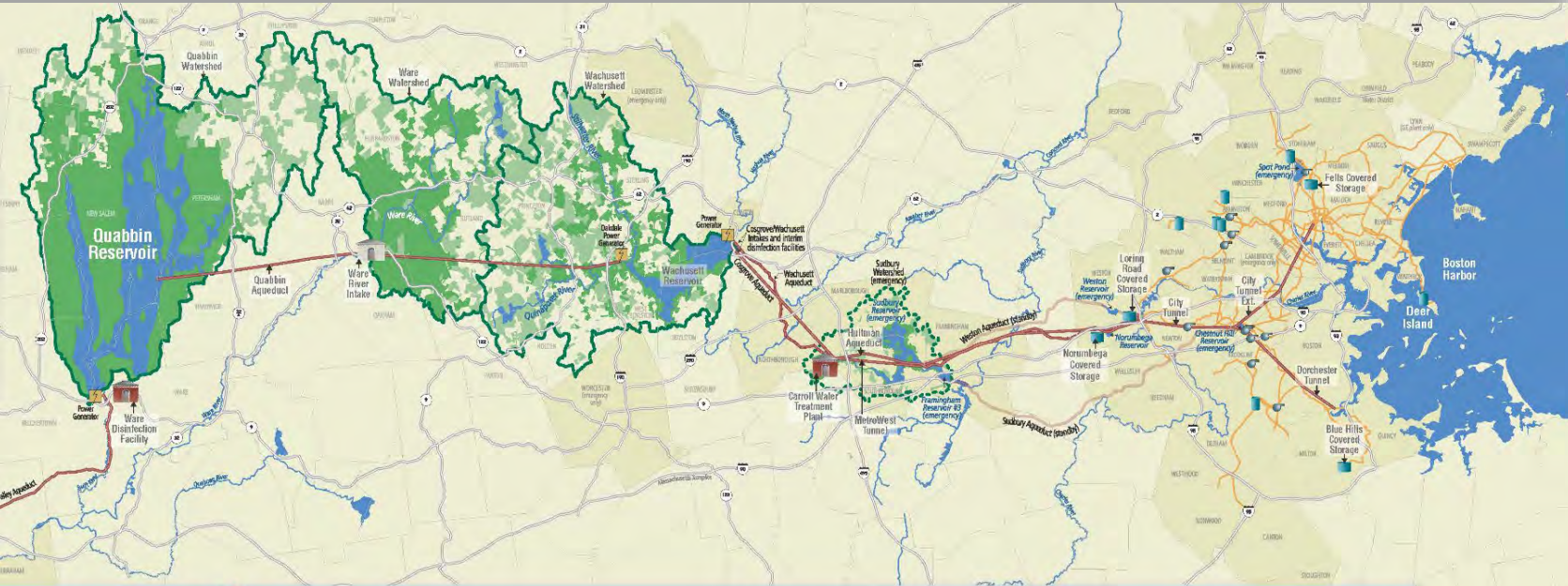




# MWRA Water System

## DCR MWRA Water System

- LEGEND
- Water Service Communities
  - Land owned by DCR Watershed Division
  - Protected Landholdings
  - Watershed Boundaries
  - Aqueducts and Tunnels
  - Roads
  - Distribution Pipes
  - Treatment Plant
  - Covered Storage
  - Storage Tanks
  - Pump Stations
  - Hydro-Electric Power Plant







# Carroll Water Treatment Plant in Marlborough





# Treatment Processes

- Primary disinfection using ozone and ultraviolet light
- Adjust pH and alkalinity for lead and copper corrosion control, with sodium carbonate and carbon dioxide
- Residual disinfection using monochloramine (a combination of chlorine and ammonia)
- Fluoridation with hydro-fluorosilicic acid







# Fluoridation equipment





## Coordination with Massachusetts DPH

- MWRA has fluoridated the water since 1970s
- Given importance of fluoridation for dental health, staff coordinated with Department of Public Health
- DPH indicated that no specific additional actions were required by consumers or dentists
- DPH and DEP reviewed and approved MWRA's outreach plan



## Agreed Upon Outreach Activities

- This week, email notices will be sent from MWRA to all local water superintendents and local health officers
- Note on highlights page of MWRA Monthly Water Quality report and continuing throughout the shutdown
- Notice of the temporary shutdown added to MWRA's fluoridation website page
- Notice on front page of the MWRA website prior to and during shutdown
- Update progress and schedule on website as needed





## Current Project Schedule

- Late February, use remainder of fluoride, flush tanks and piping
- Mid March, fluoridation will be stopped and all equipment turned over to the contractor
- Late April to early May, complete construction and test equipment with water
- Late May, restart fluoridation
- Current schedule and progress will be posted on MWRA website



*FY2024 Proposed  
Capital Improvement Program*

January 18, 2023



# Review of FY19-23 Cap

FY19-23 Base-Line Cap		FY19	FY20	FY21	FY22	FY23	Total FY19-23
	Projected Expenditures	\$179.2	\$276.1	\$251.3	\$194.9	\$150.4	\$1,051.8
	I/I Program	(19.2)	(25.7)	(24.3)	(27.9)	(26.1)	(123.2)
	Water Loan Program	(8.3)	(8.4)	(7.2)	(5.6)	(2.8)	(32.4)
	<b>MWRA Spending</b>	<b>\$151.7</b>	<b>\$241.9</b>	<b>\$219.7</b>	<b>\$161.4</b>	<b>\$121.4</b>	<b>\$896.2</b>
	Contingency	9.9	15.9	14.5	11.0	8.2	59.4
	Inflation on Unawarded Construction	0.7	5.0	7.8	7.2	8.5	29.3
	Chicopee Valley Aqueduct Projects	(0.0)	0.0	0.0	0.0	0.0	(0.0)
<b>FY19 Final FY19-23 Spending</b>	<b>\$162.3</b>	<b>\$262.8</b>	<b>\$242.0</b>	<b>\$179.6</b>	<b>\$138.1</b>	<b>\$984.8</b>	

FY23 Final		FY19	FY20	FY21	FY22	FY23	Total FY19-23
	Projected Expenditures	\$142.9	\$150.4	\$148.4	\$164.4	\$278.5	\$884.5
	I/I Program	(39.6)	(33.7)	(31.3)	(30.6)	(25.1)	(160.3)
	Water Loan Program	(13.8)	(4.3)	(14.9)	(12.0)	(23.4)	(68.4)
	<b>MWRA Spending</b>	<b>\$89.4</b>	<b>\$112.3</b>	<b>\$102.2</b>	<b>\$121.8</b>	<b>\$230.0</b>	<b>\$655.8</b>
	Contingency	0.0	0.0	0.0	0.0	14.6	14.6
	Inflation on Unawarded Construction	0.0	0.0	0.0	0.0	2.2	2.2
	Chicopee Valley Aqueduct Projects	(0.0)	0.0	0.0	0.0	0.0	(0.0)
<b>FY23 Draft Final FY19-23 Spending</b>	<b>\$89.4</b>	<b>\$112.3</b>	<b>\$102.2</b>	<b>\$121.8</b>	<b>\$246.8</b>	<b>\$672.6</b>	

*\$\$ in millions*



# FY24 Proposed CIP – FY24-28 Cap

FY24 Proposed		FY24	FY25	FY26	FY27	FY28	FY24-28
	Projected Expenditures excl. Metro Tunnel	\$327.3	\$318.1	\$299.7	\$321.7	\$300.1	\$1,566.8
	Metropolitan Tunnel	\$15.6	\$15.3	\$19.2	\$18.4	\$73.0	\$141.3
	I/I Program	(41.7)	(36.7)	(26.5)	(27.3)	(34.1)	(166.3)
	Water Loan Program	(15.2)	(11.2)	(5.0)	(2.6)	8.6	(25.4)
	<b>MWRA Spending</b>	<b>\$286.0</b>	<b>\$285.4</b>	<b>\$287.3</b>	<b>\$310.2</b>	<b>\$347.5</b>	<b>\$1,516.5</b>
	Contingency	18.2	18.6	19.5	21.3	27.9	105.6
	Inflation on Unawarded Construction	3.3	7.9	12.8	21.0	32.0	76.9
	Chicopee Valley Aqueduct Projects	(0.3)	(0.3)	0.0	0.0	0.0	(0.6)
	<b>Projected Spending before Adjustment</b>	<b>\$307.2</b>	<b>\$311.7</b>	<b>\$319.5</b>	<b>\$352.5</b>	<b>\$407.5</b>	<b>\$1,698.4</b>
Spend Rate Adjustment (25%)*	(76.8)	(77.9)	(79.9)	(88.1)	(101.9)	(424.6)	
<b>FY24 Proposed FY24-28 Spending</b>	<b>\$230.4</b>	<b>\$233.8</b>	<b>\$239.7</b>	<b>\$264.3</b>	<b>\$305.6</b>	<b>\$1,273.8</b>	

\*Based on historical underspending FY04-FY22 excluding community loan programs



# FY24 Proposed CIP – Upcoming Cap Period Projections

FY24 Proposed		FY24-28	FY29-33
	Projected Expenditures excl. Metro Tunnel	\$1,566.8	\$1,233.8
	Metropolitan Tunnel	\$141.3	\$553.9
	I/I Program	(166.3)	32.5
	Water Loan Program	(25.4)	117.9
	<b>MWRA Spending</b>	<b>\$1,516.5</b>	<b>\$1,938.1</b>
	Contingency	105.6	167.2
	Inflation on Unawarded Construction	76.9	315.1
	Chicopee Valley Aqueduct Projects	(0.6)	(4.4)
	<b>Projected Spending before Adjustment</b>	<b>\$1,698.4</b>	<b>\$2,415.9</b>
Spend Rate Adjustment (25%)*	(424.6)	(604.0)	
<b>FY24 Proposed FY24-28 Spending</b>	<b>\$1,273.8</b>	<b>\$1,811.9</b>	

*\$s in millions*



# FY24 Proposed CIP – Top Spending Subphases Excluding Community Loans in FY24

Project	Subphase	FY24 \$s in Millions
DI Treatment Plant Asset Protection	Clarifier Rehab Phase 2 - Construction	\$22.6
Metro Redundancy Interim Improvements	Waltham Water Pipeline Construction	\$13.5
Quabbin Transmission System	Wach LGH Pipe & Boiler Replacement Construction	\$11.2
NIH Redundancy & Storage	Section 89 & 29 Repl - Construction	\$10.8
New Connecting Mains-Shaft 7 to WASM 3	CP3-Sect 23,24,47, Rehabilitation	\$9.8
Braintree-Weymouth Relief	B/W Improvements - Construction	\$9.1
New Connecting Mains-Shaft 7 to WASM 3	Sect 25 & 24 - Construction CP-2	\$9.0
DI Treatment Plant Asset Protection	Fire Alarm System Replacement - Construction	\$7.5
DI Treatment Plant Asset Protection	DITP Roofing Replacement	\$7.0
Siphon Structure Rehabilitation	Construction	\$6.3
DI Treatment Plant Asset Protection	MCC & Switchgear Replace Construction	\$6.0
Facility Asset Protection	Hayes Pump Station Rehab Construction	\$6.0
New Connecting Mains-Shaft 7 to WASM 3	Section 75 Extension - Construction CP-1	\$6.0
Metro Tunnel Redundancy	Geotechnical Support Services	\$6.0
Metro Redundancy Interim Improvements	CP3 Shafts 7, 7B, 7C, 7D	\$5.7
Metro Tunnel Redundancy	Preliminary Design & MEPA Review	\$5.1
<b>Total Contracts &gt; \$5 million (excl. Loan Programs)</b>		<b>\$141.5</b>
<b>% of FY24 Spending</b>		<b>41.3%</b>
<b>Total FY24 Spending</b>		<b>\$342.9</b>

*\$s in millions*





# FY24 Proposed CIP – Top Spending Subphases Excluding Community Loans in FY24-28

Project	Subphase	FY24-FY28 \$s in Millions
DI Treatment Plant Asset Protection	Clarifier Rehab Phase 2 - Construction	\$152.7
DI Treatment Plant Asset Protection	Combined Heat & Power - Construction	\$54.3
Metro Tunnel Redundancy	Tunnel Construction	\$50.0
Facility Asset Protection	Ward Street Headworks Construction	\$46.2
DI Treatment Plant Asset Protection	SSPS VFD Replace Construction	\$45.5
Facility Asset Protection	Prison Point Rehabilitation	\$38.7
Facility Asset Protection	Columbus Park HW Construction	\$37.8
Metro Tunnel Redundancy	Admin Legal & Public Outreach	\$37.1
DI Treatment Plant Asset Protection	Digester/Storage Tank Rehab Construction	\$31.9
DI Treatment Plant Asset Protection	Fire Alarm System Replacement - Construction	\$31.0
DI Treatment Plant Asset Protection	MCC & Switchgear Replace Construction	\$23.5
New Connecting Mains-Shaft 7 to WASM 3	Sect 25 & 24 - Construction CP-2	\$22.0
Metro Redundancy Interim Improvements	Waltham Water Pipeline Construction	\$21.2
Northen Extra High Service New Pipelines	CP-2 NEH Improvements	\$20.7
Facility Asset Protection	Hayes Pump Station Rehab Construction	\$19.5
<b>Top 15 Subphase Spending (excl. Loan Programs)</b>		<b>\$632.1</b>
<b>% of FY24-28 Spending</b>		<b>37.0%</b>
<b>FY24-28 Spending</b>		<b>\$1,708.2</b>

*\$s in millions*



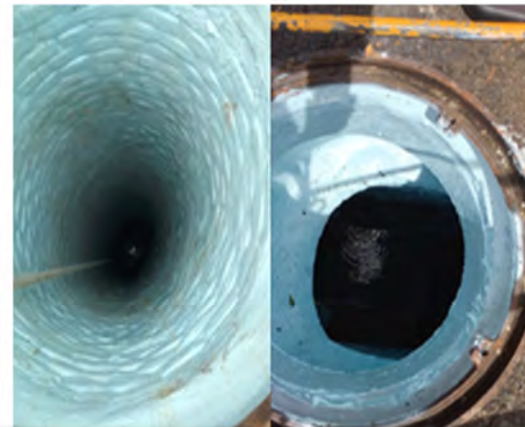
# FY24 Proposed CIP – New Projects Added – FY24-28

Project	Total Contract Amount	FY24-28 Spending
I/I Local Financial Assistance - Phase XIV	\$75.0	\$55.6
Intermediate Pump Station Rehabilitation	\$46.5	\$0.0
New Neponset Pump Station Rehabilitation	\$24.0	\$0.0
Framingham Pump Station Rehabilitation	\$24.0	\$0.0
Quincy Pump Station Rehabilitation	\$24.0	\$0.0
Squantum Pump Station Rehabilitation	\$24.0	\$0.0
Fort Point Channel & Mystic/Chelsea Confluence	\$10.0	\$9.4
CSO Updated Control Plan Design	\$2.0	\$0.3
<b>Total Wastewater</b>	<b>\$229.5</b>	<b>\$65.3</b>
CWTP Butterfly Valve 4	\$12.5	\$12.5
Brutsch Treatment Plant Sodium Hypo Upgrade	\$0.5	\$0.5
<b>Total Waterworks</b>	<b>\$13.0</b>	<b>\$13.0</b>
<b>10 New Projects</b>	<b>\$242.5</b>	<b>\$78.3</b>

*\$s in millions*



# Projects Completed in FY19-23 Cap Period







# FY24 Proposed CIP – Clarifier Rehabilitation Phase 2





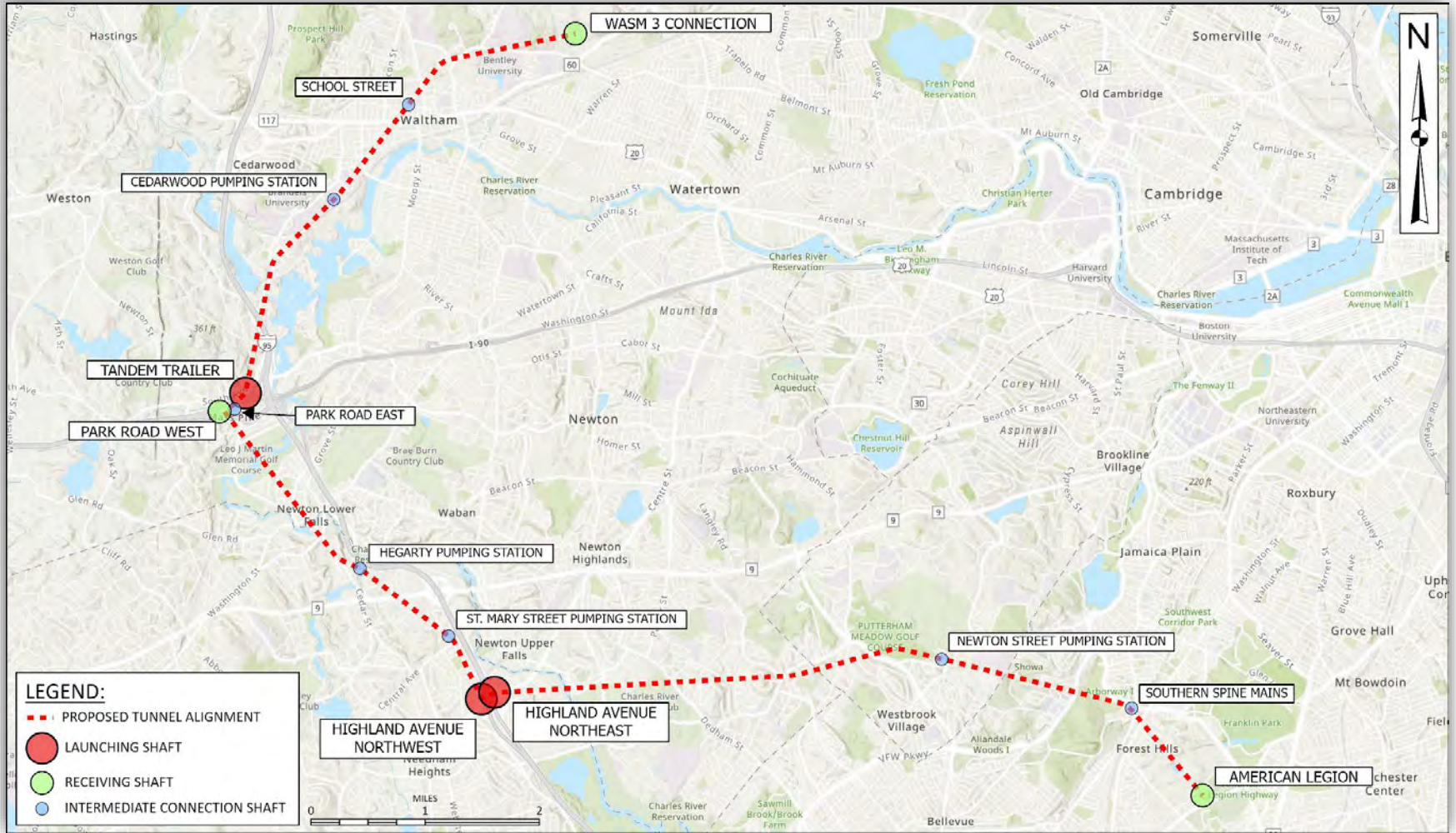
# FY24 Proposed CIP – Combined Heat and Power Construction







# FY24 Proposed CIP – Metropolitan Tunnel Construction





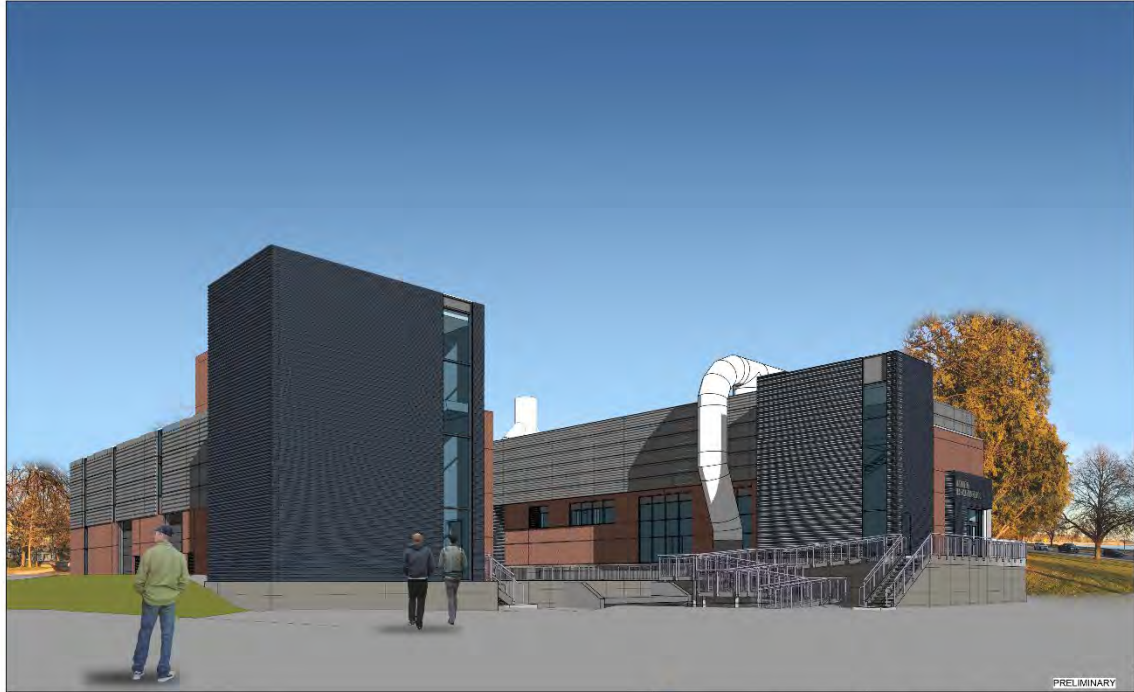


# FY24 Proposed CIP – South System Pump Station VFD Replacement





# FY24 Proposed CIP – Ward Street and Columbus Park Headworks Construction



PRELIMINARY



MASSACHUSETTS WATER RESOURCES AUTHORITY

Ward Street and Columbus Park Headworks Upgrade

100 Columbus Park Headworks  
OPTION 2a RENDERING





# FY24 Proposed CIP – Prison Point Rehabilitation





# FY24 Proposed CIP – New Projects Pump Station Rehabs

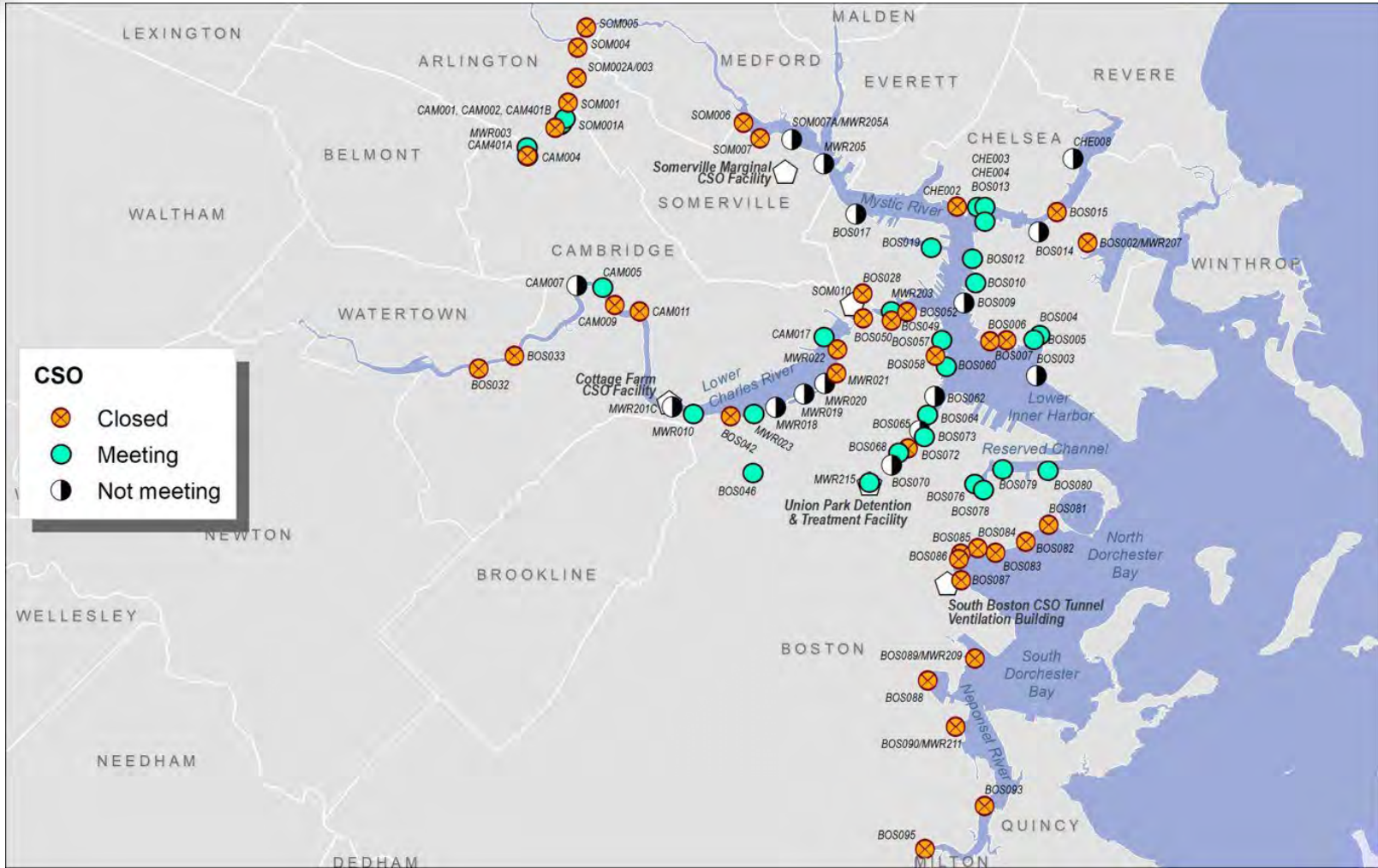


Rehab of 5 Wastewater Pump Stations - \$142.5 million





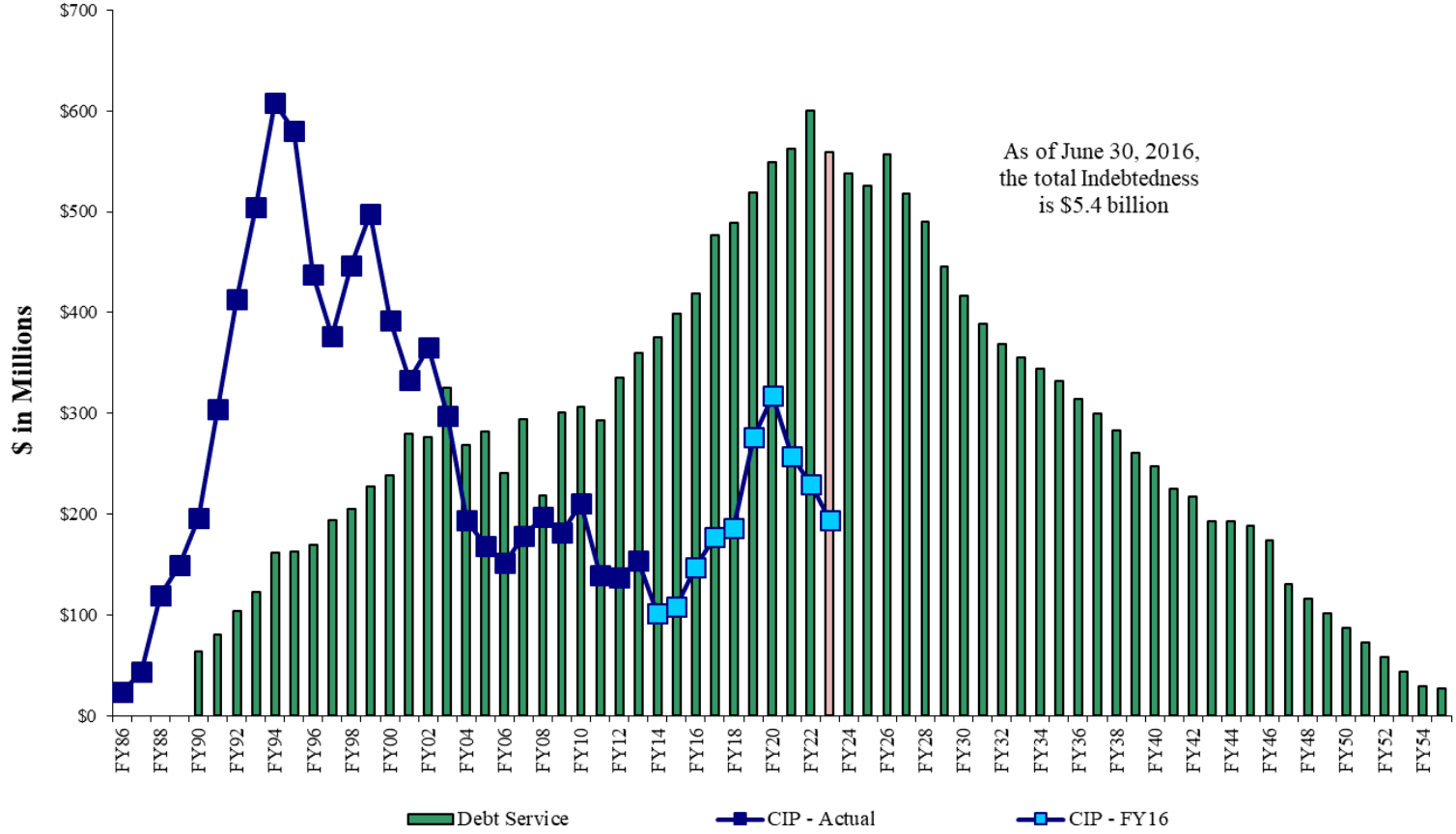
# CSO Control Plan





# Capital Spending and Debt Service – FY16

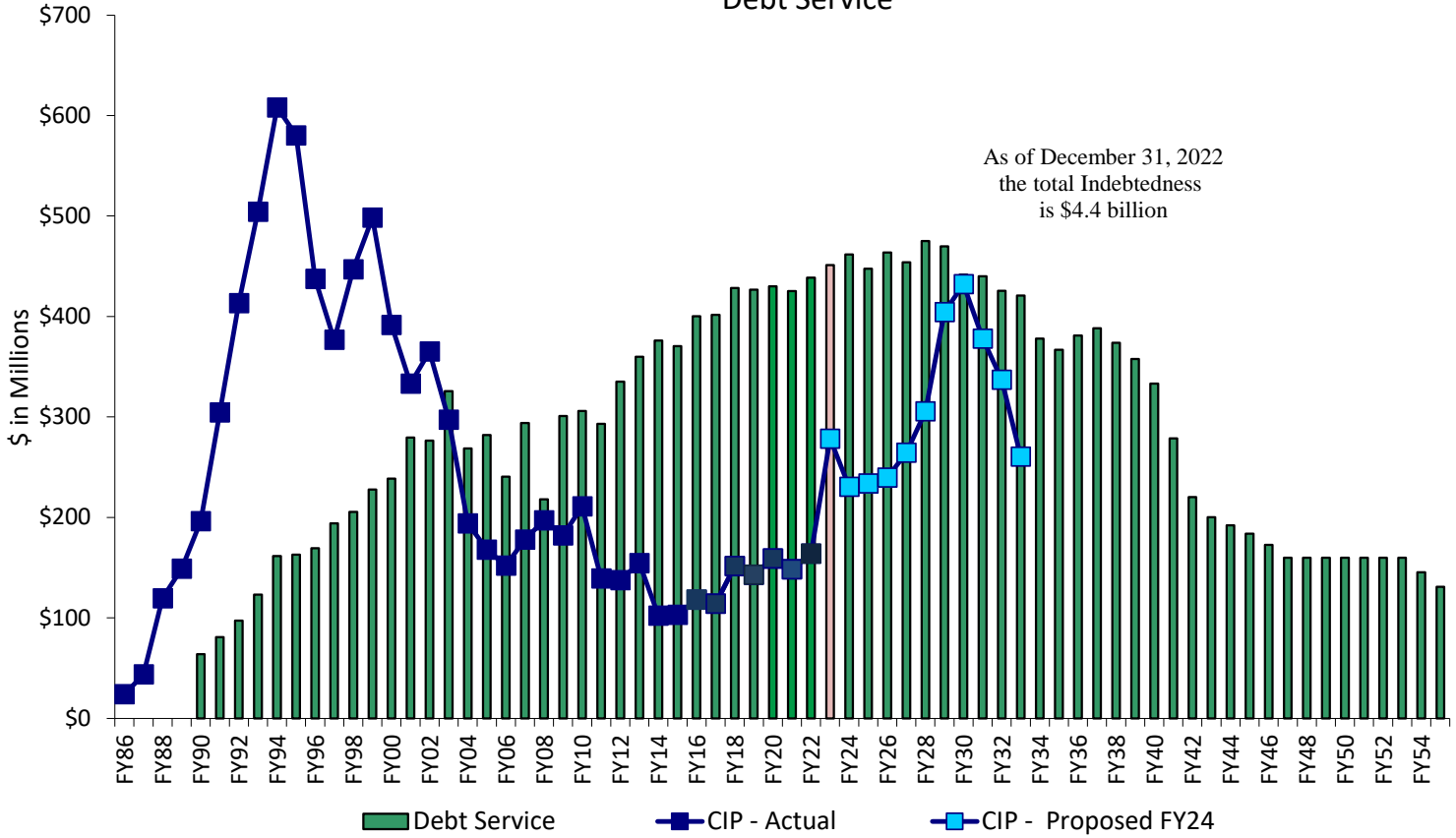
## MWRA Capital Improvement Spending & Debt Service





# Capital Spending and Debt Service

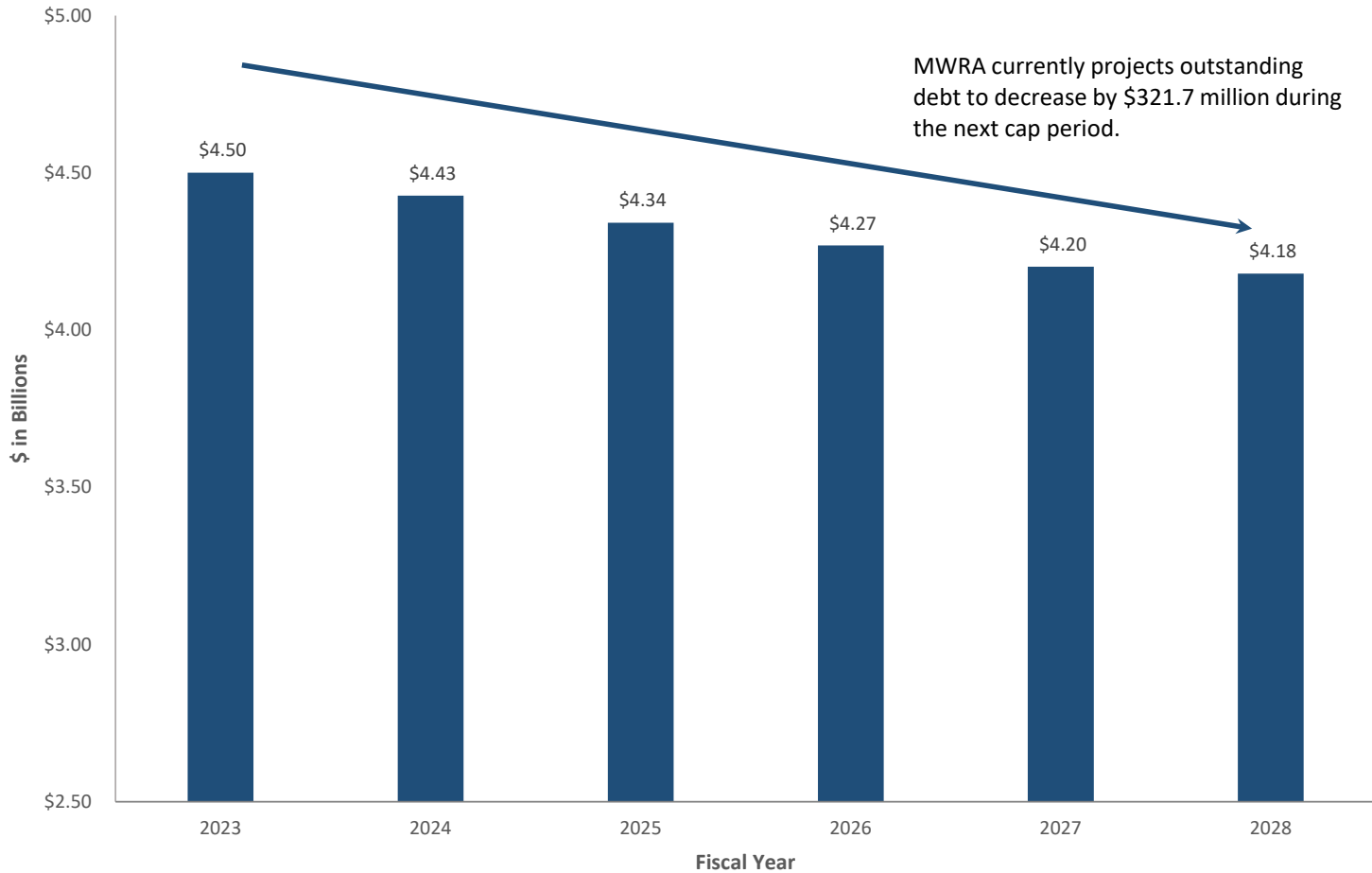
## MWRA Capital Spending & Debt Service





# Debt Service

## Projected Outstanding Debt at Fiscal Year End







## FY24 Proposed CIP – Summary and Next Steps

- Establish new Cap for FY24-28
- Break out Metropolitan Tunnel Redundancy spending vs. all other capital project spending on Cap table
- Incorporate a ‘Spend Rate Adjustment’ into Cap calculation
- Continued focus on Asset Protection and Long-Term Redundancy
- Metropolitan Tunnel Redundancy project is \$1.8 billion, an increase of \$237.6 Million over the FY23 CIP due to inflation
- Board approval to transmit to the Advisory Board for their 60-day minimum comment and review period
- Present FY24 Final CIP to the Board of Directors for approval in June 2023